IN THE CLAIMS

Each claim of the application is set forth below with a parenthetical notation immediately following the claim number indicating the claim status. The Examiner's entry of the claim amendments under Section 1.121 is respectfully requested.

1. (WITHDRAWN) A process for controlling etching on a semiconductor substrate wherein the etching is affected by the concentration of an etchant gas, and wherein the etchant gas is input to an etch chamber via a mass flow controller, the process comprising:

determining a desired etchant gas concentration;

supplying an inert gas to the etch chamber;

producing a first signal representative of an actual etchant gas concentration;

producing a second signal representative of an inert gas concentration;

relating the first and the second signals to produce a normalized etchant gas concentration signal;

comparing the normalized etchant gas concentration signal with a signal representing the desired etchant gas concentration; and

controlling the mass flow controller in response to the comparing step.

2. (WITHDRAWN) The process of claim 1 wherein the etchant gas comprises an oxygen radical.

3. (WITHDRAWN) The process of claim 1 wherein the inert gas comprises argon.

4. (WITHDRAWN) The process of claim 1 wherein the etchant gas comprises an oxygen radical, the process further comprising:

supplying oxygen to the etch chamber; and

forming a plasma within the etch chamber to form an oxygen radical from the oxygen.

5. (WITHDRAWN) The process of claim 1 wherein the first signal comprises a signal representative of a spectral emission line formed by the etchant gas.

6. (WITHDRAWN) The process of claim 1 wherein the second signal comprises a signal representative of a spectral emission line formed by the inert gas.

7. (WITHDRAWN) The process of claim 1 wherein the step of relating further comprises dividing the first signal by the second signal.

8. (WITHDRAWN) The process of claim 1 wherein the semiconductor substrate comprises a plurality of transistor gate features formed with predetermined dimensions, and wherein the etchant gas reduces certain feature dimensions.

9. (WITHDRAWN) The process of claim 1 wherein the step of relating comprises:

filtering the first signal to produce a filtered first signal representative of a spectral emission line formed by the etchant gas;

filtering the second signal to produce a filtered second signal representative of a spectral emission line formed by the inert gas; and

relating the first and the second filtered signals to produce the normalized etch gas concentration signal.

10. (WITHDRAWN) The process of claim 9 wherein the step of relating further comprises filtering the normalized etchant gas signal to remove short duration temporal variations.

11. (WITHDRAWN) The process of claim 10 where in the step of filtering further comprises integrating the normalized etchant gas signal.

12. (WITHDRAWN) The process of claim 1 wherein the first and the second signals comprise first and second optical signals, respectively.

13. (WITHDRAWN) The process of claim 12 further comprising filtering the first optical signal to produce a filtered first optical signal and transforming the filtered first optical signal to a first electrical signal, wherein the first electrical signal represents the actual etchant gas concentration.

14. (WITHDRAWN) The process of claim 12 further comprising filtering the second optical signal to produce a filtered second optical signal and transforming the filtered second optical signal to a second electrical signal, wherein the second electrical signal represents the inert gas concentration.

15. (WITHDRAWN) A process for controlling isotropic etching on a semiconductor substrate wherein the isotropic etching is affected by a concentration of an etchant gas input to an etch chamber via a mass flow controller, and wherein anisotropic etching also occurs in the etch chamber, the process comprising:

determining a desired etchant gas concentration;

supplying a passivating gas to the etch chamber;

producing a first signal representative of an actual etchant gas concentration;

producing a second signal representative of a passivating gas concentration;

relating the first and the second signals to produce a third signal;

comparing the third signal with a predetermined reference; and

controlling the concentration of at least one of the etchant gas and the passivating gas in response to the comparing step.

16. (WITHDRAWN) The process of claim 15 wherein the third signal represents a ratio of the etchant gas and the passivating gas.

17. (WITHDRAWN) The process of claim 15 wherein the first signal comprises a signal representative of a spectral emission line formed by the etchant gas.

18. (WITHDRAWN) The process of claim 15 wherein the second signal comprises a signal representative of a spectral emission line formed by the passivating gas.

19. (WITHDRAWN) The process of claim 15 wherein the reference relates to the ratio of the passivating gas to the etchant gas to limit an extent of the anisotropic etch.

20. (WITHDRAWN) A process for controlling an etch rate on a semiconductor substrate wherein the etch rate is substantially affected by the concentration of an etchant gas, and wherein the etchant gas is input to an etch chamber via a mass flow controller, the process comprising:

determining the etchant gas concentration in the etch chamber;

comparing the concentrations with a target value;

generating an error signal in response to the comparing step; and

controlling the mass flow controller in response to the error signal.

21. (ORIGINAL) An apparatus for controlling an etch process on a semiconductor substrate wherein the etch process is affected by a concentration of an etchant gas, and wherein the etchant gas is input to an etch chamber via a first mass flow controller, and wherein an inert gas in input to the etch chamber via a second mass flow controller, the apparatus comprising:

a first optical device for producing a first signal representative of an actual etchant gas concentration;

a second optical device for producing a second signal representative of an inert gas concentration;

an element for relating the first and the second signals to produce a normalized etchant gas concentration signal;

a comparing element for comparing the normalized etchant gas concentration signal with a signal representing a desired etchant gas concentration and for producing a normalized signal in response thereto, wherein the normalized signal is provided to the first mass flow controller for controlling the etchant gas concentration.

22. (ORIGINAL) The apparatus of claim 21 wherein the etchant gas comprises an oxygen radical.

23. (ORIGINAL) The apparatus of claim 21 wherein the inert gas comprises argon.

24. (ORIGINAL) The apparatus of clam 21 further comprising an energy source for forming a plasma in the etch chamber.

25. (ORIGINAL) The apparatus of claim 24 wherein the first signal comprises a first signal representative of a spectral emission line formed by the etchant gas interacting with the plasma.

26. (ORIGINAL) The apparatus of claim 24 wherein the second signal comprises a second signal representative of a spectral emission line formed by the inert gas interacting with the plasma.

27. (ORIGINAL) The apparatus of claim 21 wherein the element for relating the first and the second signals comprises a divider.

28. (ORIGINAL) The apparatus of claim 21 wherein the first optical device comprises in serial relation, an optical fiber disposed to receive light energy from within the etch chamber, an optical filter and a light detector for producing the first signal.

29. (ORIGINAL) The apparatus of claim 21 wherein the second optical device comprises in serial relation, an optical fiber disposed to receive light energy from within the etch chamber, an optical filter and a light detector for producing the second signal.

30. (ORIGINAL) The apparatus of claim 21 wherein the first and the second optical devices are responsive to a bifurcated optical fiber disposed within an opening in the etch chamber and responsive to spectral emissions in the etch chamber, wherein the optical fiber carries an optical signal representative of the actual etchant gas concentration and the inert gas concentration.